WHITE PAPER NO. 5A – RESPONSES TO THE API PANEL REPORT

Response to a Document by The Johnson Company

ECOSYSTEM-BASED REHABILITATION PLAN – AN INTEGRATED PLAN FOR HABITAT ENHANCEMENT AND EXPEDITED EXPOSURE REDUCTION IN THE LOWER FOX RIVER AND GREEN BAY

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ABSTRACT

Appleton Papers, Inc. (API) provided funding to assemble a panel of university professors and scientists to evaluate the *Proposed Remedial Action Plan, Lower Fox River and Green Bay* (Proposed Plan) (WDNR and EPA, 2001). The Appleton Paper, Inc. Panel (referred to as "the API Panel") completed a report entitled *Ecosystem-Based Rehabilitation Plan – An Integrated Plan for Habitat Enhancement and Expedited Exposure Reduction in the Lower Fox River and Green Bay* (referred to herein as the "Panel Report") dated January 17, 2002 (The Johnson Company, 2002) that was submitted as part of the comments during the public response period. The Panel Report contended that the Agencies' proposed contaminated sediment removal plan would be limited by water quality discharge issues, and that risk reduction could be better achieved by capping areas of contaminated sediments within the Lower Fox River. They further purported that the capping would also result in habitat enhancement.

This White Paper is one in a series of papers that focuses on evaluating the claims of the Panel Report. Specifically, this paper evaluates the API Panel's basis for estimating risk reduction as the sediment-weighted average concentration (SWAC). This White Paper evaluates the Panel Report's polychlorinated biphenyl (PCB) SWAC computations with those presented in the *Remedial Investigation for the Lower Fox River and Green Bay, Wisconsin* (RI) (RETEC, 2002a) and *Feasibility Study for the Lower Fox River and Green Bay, Wisconsin* (FS) (RETEC, 2002b).

The following findings are presented in this White Paper:

- The Panel Report does not follow National Research Council guidance in that it does not develop site-specific risk reduction numbers.

- The Panel Report does not propose risk reduction equivalent to the Proposed Plan. The SWAC proposed by the API Panel is two to three times that selected for the Proposed Plan and is based upon engineering implementability and not risk reduction.

- The SWAC reported in the Panel Report is inaccurate; the recalculated SWAC is up to four times greater than that selected for the Proposed Plan.

- The Remedial Action Level (RAL) needed to achieve the recalculated Panel Report SWAC for all reaches is 5 ppm.

- Directly comparing the costs and time to achieve the SWAC between the Proposed Plan and the Panel Report is not a direct comparison. In order to make those comparisons, the API Panel's proposed remedy would need to be compared to the 5 ppm RAL from the FS.

PURPOSE

The purpose of this white paper is to compare the SWAC developed and presented within the Wisconsin Department of Natural Resource's (WDNR's) Proposed Plan, with those proposed by the API Panel. The API Panel included their estimations as part of the Panel Report dated January 17, 2002 (The Johnson Company, 2002). In order to understand the API Panel's position, it was first necessary to compare the post-remedy SWAC in the Proposed Plan and the Panel Report to determine if there is a comparable level of risk reduction between them. This white paper provides that basis for comparison.

During the review of the Panel Report, it became apparent that the API Panel did not have the benefit of being able to accurately estimate the SWAC in a manner comparable to that done for the FS. For the FS, detailed PCB distribution maps were generated using all existing sediment data; interpolating the PCB concentration over the area of the Operable Unit (OU). These methods are described within the RI and FS, and detailed in Technical Memorandum 2e (WDNR, 1999). As part of the interpolation, a SWAC could be generated by summing the literally thousands of individual data points in the bed maps, and averaging those over the area of the OU. By contrast, the Panel Report digitized the RI maps, assumed a 50 percent concentration within an existing concentration isopleth,[1] and then averaged across the area of the OU. While the API Panel had access to Technical Memorandum 2e, the Fox River Database, and all bed maps produced, they chose not to follow the same methodology. Why they chose this alternate, imprecise method is never explained. The method the Panel Report used also assumes a normal distribution across the range, but this is not consistent with the actual data.

The relationship between sediment concentrations of PCBs and their direct link to risks were documented within the *Baseline Human Health and Ecological Risk Assessment for the Lower Fox River and Green Bay, Wisconsin, Remedial Investigation and Feasibility Study* (BLRA) (RETEC, 2002c), and developed further into RALs in the FS. The BLRA and the FS followed the guidance put forth by the National Academy of Sciences (NAS) (NRC, 2001) in developing site-specific risk reduction goals. These goals, as articulated in Section 5 of the FS, are to reduce risks to human health and the environment. From a range of potential RALs, WDNR and the United States Environmental Protection Agency (EPA) selected 1 ppm, which would result in SWACs of 0.19, 0.27, and 0.16 ppm in OUs 1, 3, and 4, respectively. The API Panel proposed that a SWAC of 0.5 ppm be used as a design criterion. The proposed SWAC was not based on a site-specific assessment of risk, but rather on an engineering "implementation efficiency" estimation, and the API Panel developed their proposed capping areas and the Panel Report on that SWAC.

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[1] In the Panel Report, these calculations are presented in Exhibits 1 and 2, with the average surficial PCB concentrations as 50 percent of the mapped range. For example, within OU 1, the area within the 5 to 10 parts per million (ppm) isopleth was assumed to be at 50 percent; i.e., was reported as 7.5 ppm. Concentrations greater than 50 ppm were assumed to be at 50 ppm, notwithstanding the fact that concentrations as high as 350 ppm were present.

PROCEDURE

To compare the estimated SWACs developed by the API Panel, it was first necessary to overlay the API Panel-proposed capping areas onto the bed maps developed for the RI. Once those areas were delineated, then the resultant SWAC could be recalculated. Plots were created for OUs 1, 3, and 4, and the SWACs recalculated for each of the units. The recalculated SWAC was then compared to the number estimated and reported by the API Panel.

The capping areas proposed by the API Panel for OUs 1, 3, and 4 of the Lower Fox River are depicted on Figures 7, 8, and 9 in the Panel Report. To overlay the proposed capping areas on the interpolated PCB concentration maps, the capping areas were digitized and imported into ArcView GIS software. Upon overlaying the areas on the interpolated PCB concentration maps, it was observed that the digitized capping areas did not completely fit within the footprint of the individual OUs and required some adjustment. The Panel Report does not appear to specify the target PCB concentrations considered for capping (e.g., Deposit A, Sediment Management Units [SMUs]), but simply describes capping the "highest relative concentrations of PCBs." Since the criteria for capping was not clear, an adjustment was made to the location of the capping areas to the best extent possible to match the areas specified on Figures 7, 8, and 9 in the Proposed Plan. When the digitized capping areas were compared to the Panel Report's areas, they were approximately 6 percent larger for OUs 1 and 3, and approximately 2 percent lower for OU 4. For the purposes of this response, it was was determined that these relatively small differences would not significantly affect the SWAC comparisons.

It should be noted that the API Panel utilized for their calculations the bed maps from the RI. Newer data that has been recently reported for OU 1, and discussed in *White Paper No. 2 – Evaluation of New Little Lake Butte des Morts PCB Sediment Samples*, was not included in the Panel Report. Thus, the comparison here is solely based on those maps.

Upon overlaying the API proposed capping areas on the interpolated PCB concentration map, the respective SWACs were recalculated. The script used to calculate the SWAC by WDNR in the RI/FS was modified to recalculate the Panel Report SWAC. The step-by-step procedure for calculating the API Panel-derived SWAC is provided in Table 1.

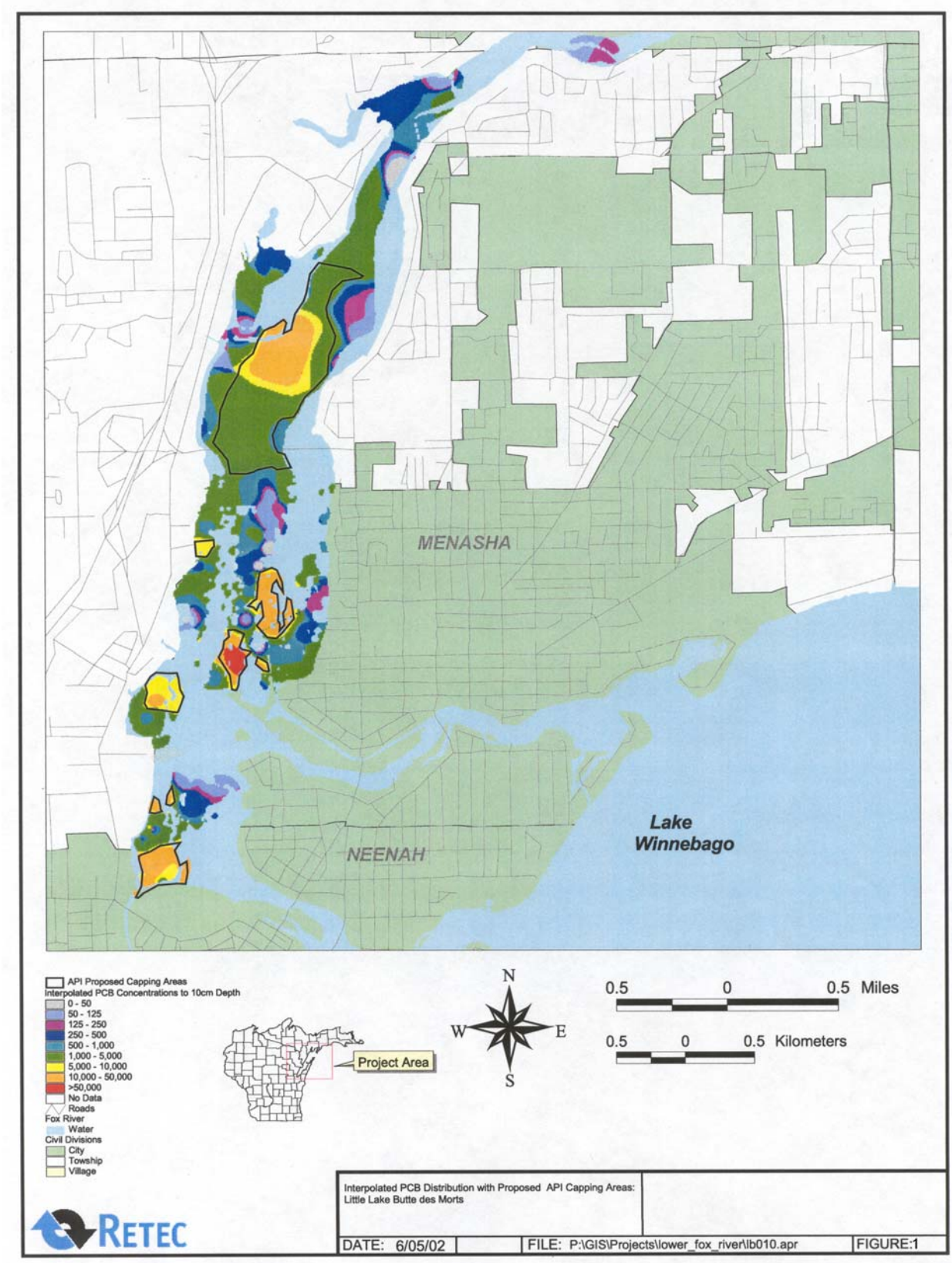
TABLE 1 PROCEDURES USED TO RE-CALCULATE THE PANEL REPORT SWAC

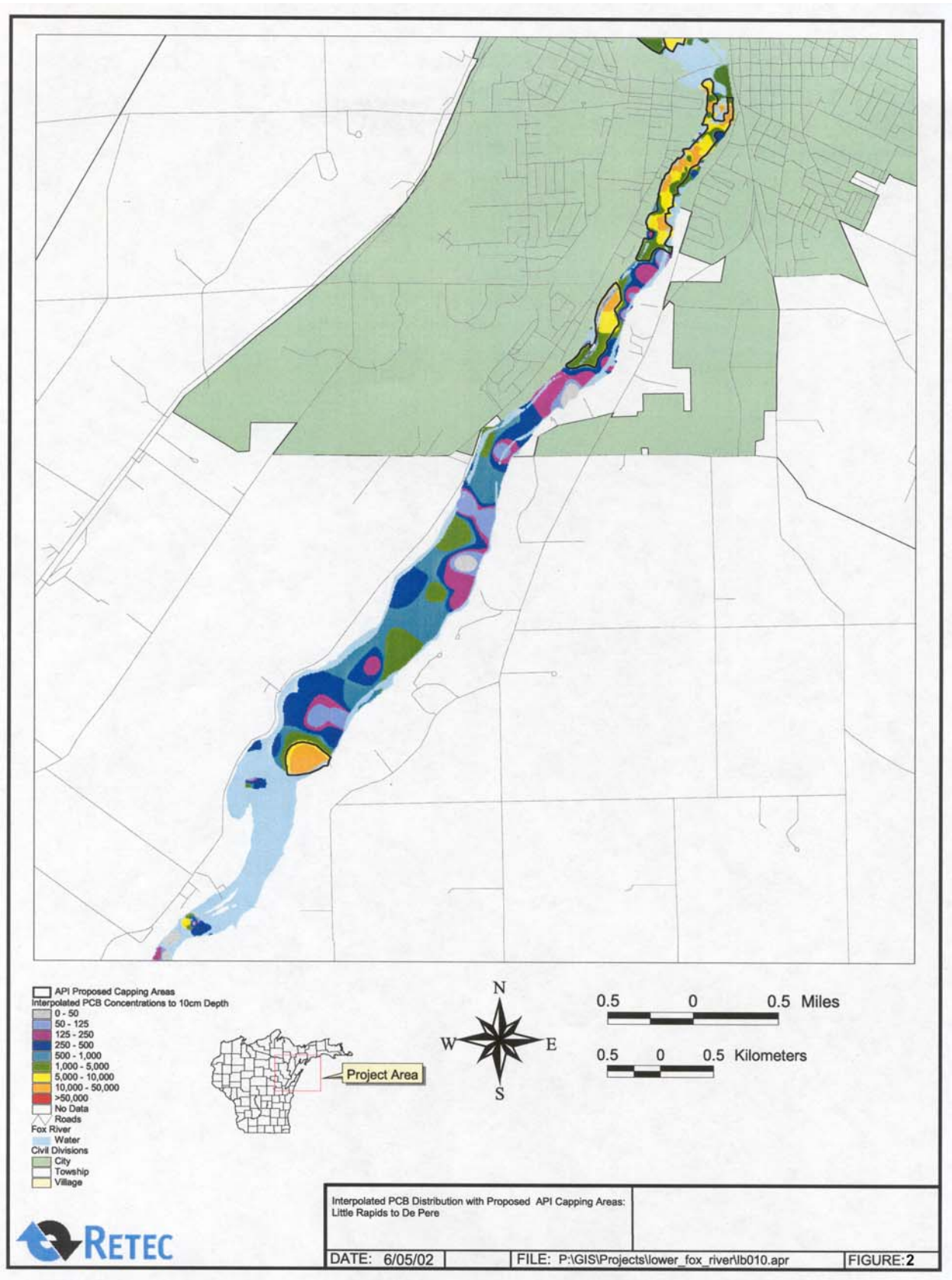
Step	Description	Action
1	**Open Mask Grids:** 0 for areas for with sediment and 1 for areas without sediment	Loads mask grid for Layer 1 (0 to 10 cm)
2	Open PCB-interpolated concentration grids	Loads PCB concentration grid for Layer 1
3	Identify areas within Layer 1 for presence of sediment and interpolated value	Surface PCB grid is modified to 50 parts per billion (ppb) if the mask grid for that layer indicates no sediment present or if there is no interpolated value
4	Identify areas within Layer 1 for presence of cap	Surface PCB grid is modified to 50 ppb if cap coverage indicates the area is capped
5	Sum of surface PCB grid concentration over the entire reach divided by area of the reach	Generates summary table and SWAC grid for each River reach

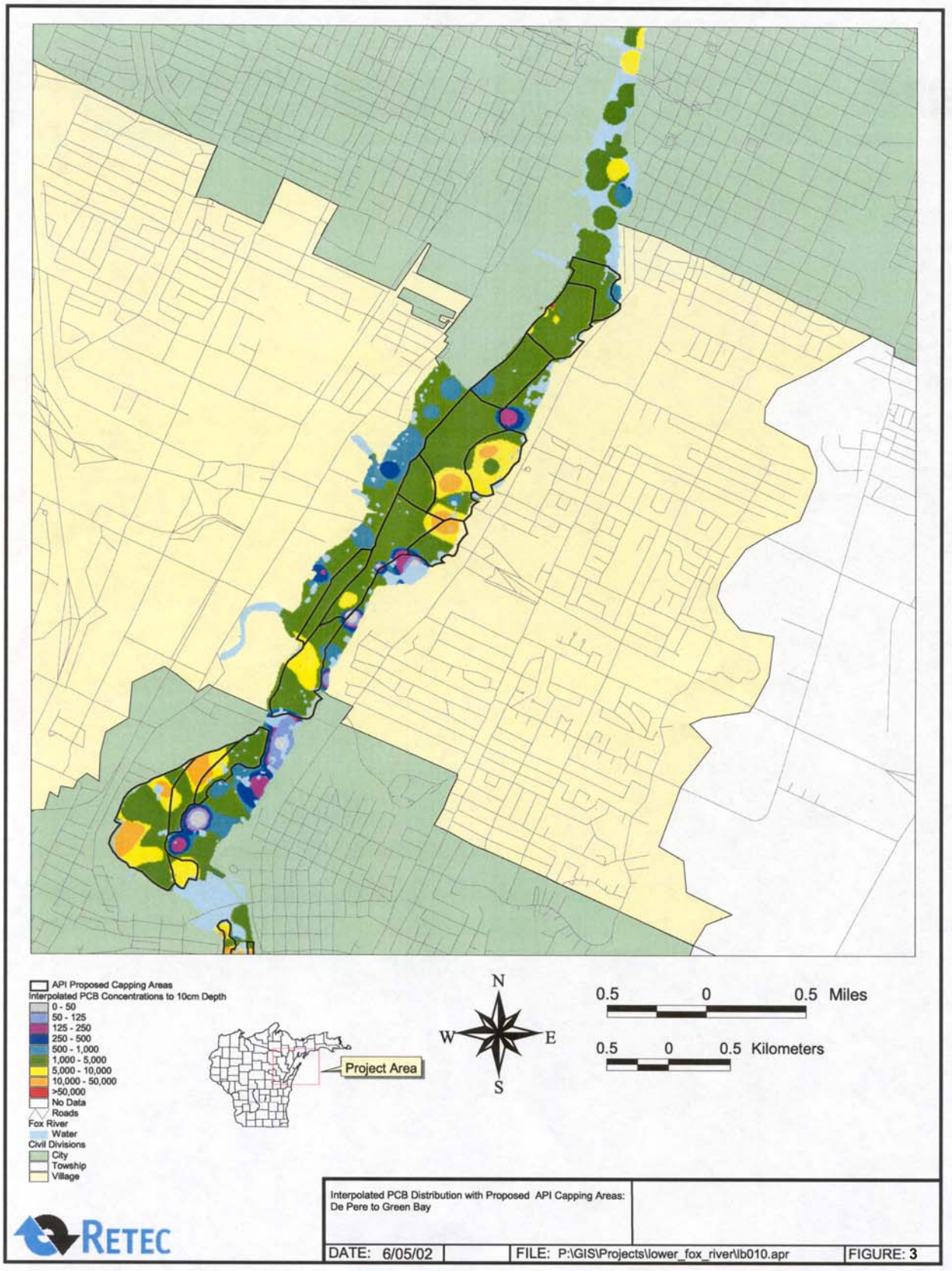
RESULTS

Figures 1 through 3 show the capping locations proposed by the API Panel for each of the three Operable Units. For OU 1, the capping areas correspond to those areas where PCB concentrations were greater than 5 ppm, with the exception that the API Panel did propose capping a larger section of Deposit E that included some portions where concentrations exceeded 1 ppm. Operable Unit 3 (Figure 2) follows a similar pattern, with portions of Deposit EE also included in the capping action. In OU 4, substantive portions of the entire reach are proposed for capping, including portions within the federal navigation channel. As noted above, the digitized areas corresponded within a few percentage points of the areas listed in the Panel Report.

Table 2 presents the comparison between the SWAC for each OU associated with the RAL of 1 ppm, the API Panel-reported SWAC, and the recalculated SWAC. The Panel Report has a stated goal of capping to achieve a SWAC of 0.5 ppm, and by their estimate the SWACs for OUs 1, 3, and 4 are 0.6, 0.53, and 0.54 ppm, respectively. Without recalculation, the API Panel SWACs are two to three times those selected by WDNR and EPA to be protective of human health and the environment. Table 2 also shows the results of recalculation of the SWAC in a manner consistent with the FS. As can be seen, the recalculated SWAC for OU 3 is fairly consistent with the API Panel estimate (0.56 ppm), but the SWAC for OUs 1 and 4 are higher (0.71 ppm), and are four times greater than the SWAC associated with the 1 ppm RAL identified in the Proposed Plan. For reference, Table 2 also shows that the RAL identified within the FS that would be most closely associated with the Panel Report SWAC of 0.7 ppm would be 5 ppm.


MENASHA
NEENAH
Lake
Winnebago
API Proposed Capping Areas
Interpolated PCB Concentrations to 10cm Depth
0 - 50
50 - 125
125 - 250
250 - 500
500 - 1,000
1,000 - 5,000
5,000 - 10,000
10,000 - 50,000
>50,000
No Data
Roads
Fox River
Water
Civil Divisions
City
Township
Village
Project Area
N
W
E
S
0.5 0 0.5 Miles
0.5 0 0.5 Kilometers
RETEC
Interpolated PCB Distribution with Proposed API Capping Areas:
Little Lake Butte des Morts
DATE: 6/05/02
FILE: P:\GIS\Projects\lower_fox_river\lb010.apr
FIGURE:1


API Proposed Capping Areas
Interpolated PCB Concentrations to 10cm Depth
0 - 50
50 - 125
125 - 250
250 - 500
500 - 1,000
1,000 - 5,000
5,000 - 10,000
10,000 - 50,000
>50,000
No Data
Roads
Fox River
Water
Civil Divisions
City
Township
Village
Project Area
N
W
E
S
0.5 0 0.5 Miles
0.5 0 0.5 Kilometers
RETEC
Interpolated PCB Distribution with Proposed API Capping Areas:
Little Rapids to De Pere
DATE: 6/05/02
FILE: P:\GIS\Projects\lower_fox_river\lb010.apr
FIGURE:2


API Proposed Capping Areas
Interpolated PCB Concentrations to 10cm Depth
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50 - 125
125 - 250
250 - 500
500 - 1,000
1,000 - 5,000
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Project Area
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W
E
S
0.5 0 0.5 Miles
0.5 0 0.5 Kilometers
RETEC
Interpolated PCB Distribution with Proposed API Capping Areas: De Pere to Green Bay
DATE: 6/05/02
FILE: P:\GIS\Projects\lower_fox_river\lb010.apr
FIGURE: 3

TABLE 2 COMPARISON OF PROPOSED PLAN RAL AND SWACS WITH THOSE REPORTED AND RECALCULATED BY THE API PANEL FOR OPERABLE UNITS 1, 3, AND 4 IN THE LOWER FOX RIVER

Operable Unit	Proposed Plan			Panel Report			
	RAL [1] (ppm)	SWAC [1] (ppm)	Total Area (acres) [2]	Reported SWAC (ppm) [3]	Recalculated SWAC (ppm) [4]	RAL Associated with API SWAC (ppm) [5]	Total Area (acres) [6]
1	1	0.19	526	0.60	0.71	5	240
3	1	0.26	328	0.53	0.56	5	120
4	1	0.16	1,034	0.54	0.71	5	600

Notes:
[1] From Proposed Plan.
[2] Total Acres within the RAL remedial footprint.
[3] From API Panel Report
[4] Recalculated SWAC generated from the method in Table 1.
[5] RAL from Section 5 of the Draft FS.
[6] Total number of acres within the API Panel-defined remedial footprint (The Johnson Company, 2002).

DISCUSSION

The following conclusions can be drawn from this analysis:

- The Panel Report does not follow National Research Council guidance in that it does not develop site-specific risk reduction numbers.

- The Panel Report does not propose risk reduction equivalent to the Proposed Plan. The SWAC proposed by the API Panel is two to three times that selected for the Proposed Plan and is based upon engineering implementability and not risk reduction.

- The SWAC reported in the Panel Report is inaccurate; the recalculated SWAC is up to four times greater than that selected for the Proposed Plan.

- The RAL needed to achieve the recalculated Panel Report SWAC for all reaches is 5 ppm.

- Directly comparing the costs and time to achieve the SWAC between the Proposed Plan and the Panel Report is not a direct comparison. In order to make those comparisons, the API Panel's proposed remedy would need to be compared to the 5 ppm RAL from the FS.

REFERENCES

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